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EXAMINER	
HARPER, V PAUL	
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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/896,836	LEYSIEFFER ET AL.	
	Examiner	Art Unit	
	V. Paul Harper	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *96-148* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *96-115,118-138,141-148* is/are rejected.

7)☒ Claim(s) *116,117,139 and 140* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 96-102, 106-112, 123, 132, 133, and 135 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels et al. (US Patent 6,047,074), hereinafter referred to as Zoels, in view of Leonhard (U.S. Patent 5,884,260), hereinafter referred to as Leonhard, Boss et al. (U.S. Patent 5,933,805), hereinafter referred to as Boss, and Zenner et al. ("Totally implantable hearing device for sensorieural hearing loss" in The Lancet, Nov, 1998, vol. 352, No. 9142, page 1751).

Regarding **claim 96**, Zoels discloses a programmable hearing aid which includes the following:

- at least one acoustic sensor configured to convert a sensed acoustical signal into an electrical audio signal (Fig. 1 items 2 and 4, col. 2, lines 1-6);
- a ... signal processing unit configured to process said audio signal (Fig. 1, items 6 and 7, col. 2, lines 1-6), comprising:
- an actuator arrangement configured to provide output stimulation to one or more hearing structures of the recipient based on said artificial speech signal (col. 1, lines 9-

11, an electroacoustical output transducer that will necessarily stimulate hearing structures),

In addition, Zoels' invention includes a programmable processor (implying *inter alia* that it is adaptable and contains adaptable modules [col. 2, lines 20-25]), but Zoels does not specifically disclose: "an adaptive speech analysis and recognition module ..., and an adaptive speech synthesis module configured to convert said audio signal into an artificial speech signal ...; said speech analysis and recognition module and said speech synthesis module each being re-programmable ...." However, the examiner contends that these features were well known in the art, as taught by Leonhard.

In the same field of endeavor, Leonhard discloses a system for detecting and generating transient conditions in auditory signals. Leonhard's system performs signal analysis, recognition and synthesis (Figs. 8, 19, abstract, col. 1, lines 5-20; col. 15, lines 16-25), and Leonhard further teaches that the invention may be used in hearing aids to improve noise suppression in speech signals (col. 15, lines 30-34).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the algorithmic features, as taught by Leonhard, for the purpose of improving the quality of the speech signal generated (Leonhard, col. 15, lines 30-34).

Furthermore, Zoels does not specifically teach "an adaptive speech analysis and recognition module configured to detect and extract prosodic features from said audio signal, and an adaptive speech synthesis module configured to convert said audio signal into an artificial speech signal based on said extracted prosodic features."

However, the examiner contends that this concept was well known in the art, as taught by Boss.

In the same field of endeavor, Boss discloses a system for retaining prosody during speech analysis for later playback. Boss's system includes a speech analyzer for detecting phonemes and a synthesizer for playback (abstract, Fig. 4 item 48, Fig. 5 item 98, col. 2, line 61 through col. 3, line 19).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels in view of Leonhard by specifically providing the features, as taught by Boss, since it is well known in the art for the purpose of improving the quality of the synthesized speech for hearing impaired individuals (Quagliaro, U.S. Patent 6,408,273, col. 3, lines 10-16).

Furthermore, Zoels does not specifically teach: "a fully implantable signal processing unit configured to process said audio signal, comprising: [re-programmable modules] each being re-programmable while said signal processing unit is implantable. However, the examiner contends that this concept was well known in the art, as taught by Zenner.

In the same field of endeavor, Zenner teaches the use of a totally implantable hearing device for senorineural hearing loss where the device can be programmed by induction (p.1, ¶2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the features,

as taught by Zenner, because of the improved performance that can be realized by using such a structure (Zenner, p. 1, ¶1).

Regarding **claim 97**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Zenner teaches "wherein said adaptive speech analysis and recognition module and said adaptive speech synthesis module are re-programmable via wireless telemetry means" (¶2, digitally programmed by induction).

Regarding **claim 98**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Zoels teaches "wherein said signal processing unit is further configured to transmit said audio signal to said actuator arrangement without converting said audio signal into said artificial speech signal, and wherein said actuator arrangement is configured to provide output stimulation based on said transmitted audio signal" (col. 5, lines20-44, the user can select between natural or technically generated signals to enable enjoyment [i.e., bypass processing], where when the ability to generate artificial speech is included, as taught by Leonhard and Boss, it would be obvious to include the selection process to bypass the synthesis operation , e.g., to enhance the quality of music heard).

Regarding **claim 99**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 98). In addition, Zoels teaches

"wherein said adaptive speech analysis and recognition module and said adaptive speech synthesis module are configured to be turned off to enable processing of said audio signal without converting said audio signal to said artificial speech signal" (see reasons for rejection of claim 98).

Regarding **claim 100**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 99). In addition, Zoels teaches "further configured to automatically turn off said adaptive speech analysis and recognition module and said adaptive speech synthesis module to permit processing of said audio signal without converting said audio signal into said artificial speech signal" (col. 5, lines 37-41, automatic change).

Regarding **claim 101**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 99). In addition, Zoels in view of Zenner teaches "further configured to turn off said adaptive speech analysis and recognition module and said adaptive speech synthesis module to permit processing of said audio signal without converting said audio signal into said artificial speech signal in response to a control signal from a remote control" (Zoels, col. 5, lines 37-40, manual change; Zenner, ¶2, digitally programmed by induction; where since the device is implantable it would be obvious to support the manual change operation taught by Zoels using the induction technique taught by Zenner, to allow for the bybass operation and the enhancement of certain types of listening, e.g., music).

Regarding **claim 102**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Leonhard teaches "wherein said adaptive speech analysis and recognition module is configured to assign said audio signal to phonetic or lexical categories, and wherein said adaptive speech synthesis module is configured to convert said audio signal assigned to phonetic or lexical categories to said artificial speech signal" (col. 11, lines 1-9, col. 13, lines 14-26, col. 15, lines 17-24, Figs. 8 and 19, items 23 [phoneme determination unit] and 24 [word determination unit], during analysis, recognition and synthesis, phonemes are used).

Regarding **claim 106**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Zoels teaches "said signal processing unit further comprises: modules configured to perform tinnitus masking" (col. 2, lines 36-45).

Regarding **claim 107**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Zoels teaches "wherein said modules configured to perform tinnitus masking are configured to perform said tinnitus masking simultaneously with said conversion of said audio signal into said artificial speech signal" (col. 5, lines 25-35, various combinations including a combination of hearing aid with tinnitus therapy where Leonhard and Boss teach the use of artificial speech [see rejection of claim 96]).

Regarding **claim 108**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Leonhard teaches "wherein said adaptive speech analysis and recognition module is further configured to analyze said audio signal by performing speech segmentation or recognition" (Figs. 8, 19, abstract, col. 1, lines 5-20, col. 15, lines 49-54; the processor necessarily containing software modules).

Regarding **claim 109**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Zoels in view of Zenner teach "wherein said signal processing unit further comprises: adaptive signal processing algorithms configured to perform additional processing of said audio signal, and wherein said adaptive signal processing algorithms are reprogrammable after implantation of said signal processing unit (Zoels, col. 2, lines 20-25, replacement program; Zenner, p. 1, ¶2, digitally programmed by induction, after implantation).

Regarding **claim 110**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Zenner teaches "wherein said system further comprises: a rewritable implantable storage arrangement for accommodating and reproducing operating programs, wherein the contents of said storage arrangement may be changed or replaced via wireless telemetry means" (p. 1, ¶2, digitally programmed by induction).

Regarding **claim 111**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Boss teaches "wherein said speech analysis and recognition module and said speech synthesis module comprise: dynamic modules configured to optimize speech analysis and recognition and speech synthesis" (abstract, Fig. 4, item 48; Fig. 5 item 98, col. 2, line 61 through col. 3, line 19; also adjustments [optimizations] are made, col. 8, lines 65-67; Zoels also teaches "adaptation to the hearing impairment" col. 2, lines 31-35).

Regarding **claim 112**, Zoels in view of Leonhard, Boss and Zenner teaches everything claimed, as applied above (see claim 96). In addition, Zenner teaches "wherein said at least one acoustic sensor configured to convert a sensed acoustical signal into an electrical audio signal comprises: at least one subcutaneously implantable acoustic sensor" (p. 1, ¶2, implantable broadband microphone).

Regarding **claim 123**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 121). In addition, Zoels in view of Zenner teaches "wherein said signal processing unit is configured to turn off said speech analysis and recognition module and said speech synthesis module to permit processing of said audio signal without converting said audio signal into said artificial speech signal..." (Zoels, col. 5, lines 37-40, manual change).

But Zoels does not specifically teach "…. in response to a control signal from a remote control." However, the examiner contends that this concept was well known in the art, as taught by Zenner.

In the same field of endeavor, Zenner teaches the use of a totally implantable hearing device for senorineural hearing loss where the device can be programmed by induction (p.1, ¶2, i.e., controlled from outside the body, digitally programmed by induction; where since the device is implantable it would be obvious to support the manual change operation taught by Zoels using the induction technique taught by Zenner, i.e., remote control).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the features, as taught by Zenner, because of the improved performance that can be realized by using such a structure (Zenner, p. 1, ¶1, ¶2,).

Regarding **claim 132**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 120). But Zoels does not specifically teach "wherein said signal processing unit further comprises: adaptive signal processing algorithms configured to perform additional processing of said audio signal, wherein said adaptive signal processing algorithms are reprogrammable …" (Zoels, col. 2, lines 20-25, replacement program).

But Zoels does not specifically teach " "[reprogrammable] after implantation of said signal processing unit." However, the examiner contends that this concept was well known in the art, as taught by Zenner.

In the same field of endeavor, Zenner teaches the use of a totally implantable hearing device for senorineural hearing loss where the device can be programmed by induction (p.1, ¶2, i.e., controlled from outside the body).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the features, as taught by Zenner, because of the improved performance that can be realized by using such a structure (Zenner, p. 1, ¶1).

Regarding **claim 133**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 120). But Zoels does not specifically teach "wherein said system further comprises: a rewritable implantable storage arrangement for accommodating and reproducing operating programs, wherein the contents of said storage arrangement may be changed or replaced via wireless telemetry means." However, the examiner contends that this concept was well known in the art, as taught by Zenner.

In the same field of endeavor, Zenner teaches the use of a totally implantable hearing device for senorineural hearing loss where the device can be programmed by induction (p.1, ¶2, i.e., controlled from outside the body).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the features, as taught by Zenner, because of the improved performance that can be realized by using such a structure (Zenner, p. 1, ¶1).

Regarding **claim 135**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 120). But Zoels does not specifically teach "wherein said at least one acoustic sensor configured to convert a sensed acoustical signal into an electrical audio signal comprises: at least one subcutaneously implantable acoustic sensor." However, the examiner contends that this concept was well known in the art, as taught by Zenner.

In the same field of endeavor, Zenner teaches the use of a totally implantable hearing device for senorineural hearing loss where the device can be programmed by induction and includes an implantable microphone (p. 1, ¶2, implantable broadband microphone).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the features, as taught by Zenner, because of the improved performance that can be realized by using such a structure (Zenner, p. 1, ¶1).

2. Claims 103 and 105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels in view of Leonhard, Boss, Zenner and further in view of Sonntag, et al.

("Prosody Generation with a Neural Network: Weighting the Importance of Input Parameters"), hereinafter referred to as Sonntag.

Regarding **claim 103**, Zoels in view of Leonhard, Boss, and Zenner teaches everything claimed, as applied above (see claim 96). But Zoels does not specifically teach "wherein said adaptive speech analysis and recognition module comprises: a digitally implemented neural network having automatic algorithms configured to detect and extract said prosodic features from said audio signal." However, the examiner contends that this concept was well known in the art, as taught by Sonntag.

In the same field of endeavor, Sonntag teaches prosody generation with a neural network including the training the neural network to detect prosodic parameters (§'s 1-5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing features, as taught by Sonntag, because it is well known in the art at the time of invention for the that the use of neural networks can result in superior classification (Markowitz [see below], p. 44, ¶3).

Regarding **claim 105**, Zoels in view of Leonhard, Boss, and Zenner teaches everything claimed, as applied above (see claim 96), But Zoels does not specifically teach "wherein said adaptive speech synthesis module comprises: a digitally implemented neural network configured to convert said audio signal into said artificial

speech signal based on said extracted prosodic features." However, the examiner contends that this concept was well known in the art, as taught by Sonntag.

In the same field of endeavor, Sonntag teaches prosody generation with a neural networks including the use of a trained neural network for prosody generation during synthesis (§'s 1-5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing features, as taught by Sonntag, because it is well known in the art at the time of invention for the that the use of neural networks can result in superior classification (Markowitz [see below], p. 44, ¶3) and thus superior synthesis with prosodics.

3. Claims 104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels in view of Leonhard, Boss, Zenner and further in view of Markowitz (*Using Speech Recognition*, Prentice Hall, 1996), hereinafter referred to as Markowitz.

Regarding **claim 104**, Zoels in view of Leonhard, Boss, Zenner teaches everything claimed, as applied above (see claim 96). But Zoels does not specifically teach "wherein said adaptive speech analysis and recognition module comprises: a digitally implemented neural network having automatic algorithms configured to assign said audio signal to phonetic or lexical categories." However, the examiner contends that this concept was well known in the art, as taught by Markowitz.

In the same field of endeavor, Markowitz teaches the techniques for using and implementing speech recognition. In addition, Markowitz teaches the use of neural networks for speech recognition (p. 44, §2.5.1 "Neural Networks for Speech Recognition," p. 46, §2.5.7 "Neural Networks for Speech Coding").

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels in view of Leonhard by specifically providing the neural network techniques for speech recognition, as taught by Markowitz, for the superior classification techniques resulting from the use of neural networks (Markowitz, p. 44, ¶3).

4. Claims 113 -115, 118 and 119 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels in view of Leonhard, Boss, Zenner and further Kuzma et al. (US Patent 6,259,951), hereinafter referred to as Kuzma.

Regarding **claim 113**, Zoels in view of Leonhard, Boss, and Zenner teaches everything claimed, as applied above (see claim 96). Zoels teaches the use of an electroacoustic output transducer (col. 1, lines 9-11), but Zoels does not specifically teach "wherein said actuator arrangement comprises: at least one extracochlear actuator configured to provide excitation to fluid-filled inner-ear spaces of the recipient." However, the examiner contends that this concept was well known in the art, as taught by Kuzma.

In the same field of endeavor, Kuzma discloses an implantable cochlear stimulator system incorporating a combination electrode/transducer. Including an acoustic transducer coupled to the fluid within the cochlea (abstract, col. 2, lines 60-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the features, as taught by Kuzma, because it is well known in the art at the time of invention for the purpose of augmenting the hearing pathways with a fluid path and thus improve the hearing of the user (Kuzma, col. 2, lines 33-40).

Regarding **claim 114**, Zoels in view of Leonhard, Boss, Zenner, and Kuzma teaches everything claimed, as applied above (see claim 113). In addition, Kuzma teaches "wherein said extracochlear actuator comprises: on or more of an acoustic stimulator or an electromechanical converter" (abstract, e.g., Fig. 3, note multiple transducers).

Regarding **claim 115**, Zoels in view of Leonhard, Boss, and Zenner teaches everything claimed, as applied above (see claim 96). But Zoels does not specifically teach "wherein said actuator arrangement comprises: a flexible carrier member configured to be implanted in the cochlea of the recipient; an array of actuators mounted in said flexible carrier member configured to stimulate the cochlea of the recipient." However, the examiner contends that this concept was well known in the art, as taught by Kuzma.

In the same field of endeavor, Kuzma discloses an implantable cochlear stimulator system incorporating a combination electrode/transducer including the use of an electrode/transducer array on a flexible carrier body (col. 6, lines 51-60).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the features, as taught by Kuzma, because it is well known in the art at the time of invention for the purpose of augmenting the hearing pathways with a fluid path and thus improve the hearing of the user (Kuzma, col. 2, lines 33-40).

Regarding **claim 118**, Zoels in view of Leonhard, Boss, Zenner and Kuzma teaches everything claimed, as applied above (see claim 115). In addition, Kuzma teaches "wherein said array of actuators comprises: an array of stimulating electrodes" (abstract, col. 6, lines 51-55).

Regarding **claim 119**, Zoels in view of Leonhard, Boss, Zenner and Kuzma teaches everything claimed, as applied above (see claim 115). In addition, Kuzma teaches "wherein said array of actuators comprises: a combination of electromechanical converters and stimulating electrodes" (Fig. 3, items 62 and 64).

5. Claims 120-122, 124, 125, 129-131 and134 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels in view of Leonhard and Boss.

Regarding **claim 120**, Zoels discloses a programmable hearing aid, which includes the following features:

- at least one acoustic sensor configured to convert a sensed acoustical signal into an electrical audio signal (Fig. 1 items 2 and 4, col. 2, lines 1-6);
- a signal processing unit configured to process said audio signal (Fig. 1, items 6 and 7, col. 2, lines 1-6), comprising:
- an actuator arrangement configured to provide output stimulation to one or more hearing structures of the recipient based on said artificial speech signal (col. 1, lines 9-11, an electroacoustical output transducer that will necessarily stimulate hearing structures); and
- wherein said signal processing unit is further configured to select processing of said audio signal without converting said audio signal into said artificial speech signal (see Leonhard below for teachings corresponding to artificial speech)(col. 5, lines20-44, the user can select between natural or technically generated signals to enable enjoyment, when the ability to generate artificial speech is included (below) it would be obvious to include the selection process to enhance the enjoyment of music);
- wherein said actuator arrangement is configured to provide output stimulation based on said processed audio signal (Fig. 1, item 5, output of the processed signal).

In addition, Zoels' invention includes a programmable processor which necessarily consists of modules, but Zoels does not specifically disclose: "a speech analysis and recognition module ... and a speech synthesis module configured to

convert said audio signal into an artificial speech ...." However, the examiner contends that these features were well known in the art, as taught by Leonhard.

In the same field of endeavor, Leonhard discloses a system for detecting and generating transient conditions in auditory signals. Leonhard's system performs signal analysis, recognition and synthesis (Figs. 8, 19, abstract, col. 1, lines 5-20; col. 15, lines 16-25), and Leonhard further teaches that the invention may be used to in hearing aids to improve noise suppression in speech signals (col. 15, lines 30-34).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the algorithmic features, as taught by Leonhard, for the purpose of improving the quality of the speech signal generated (Leonhard, col. 15, lines 30-34).

Furthermore, Zoels does not specifically teach "[modules] configured to detect and extract prosodic features from said audio signal, and a speech synthesis module configured to convert said audio signal into an artificial speech signal based on said extracted prosodic features." However, the examiner contends that this concept was well known in the art, as taught by Boss.

In the same field of endeavor, Boss discloses a system for retaining prosody during speech analysis for later playback. Boss's system includes a speech analyzer for detecting phonemes and a synthesizer for playback (abstract, Fig. 4 item 48, Fig. 5 item 98, col. 2, line 61 through col. 3, line 19).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels in view of Leonhard by specifically

providing the features, as taught by Boss, since it is well known in the art for the purpose of improving the quality of the synthesized speech for hearing impaired individuals (Quagliaro, U.S. Patent 6,408,273, col. 3, lines 10-16).

Regarding **claim 121**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 120). In addition, Zoels teaches "wherein said speech analysis and recognition module and said speech synthesis module are configured to be turned off to enable processing of said audio signal without converting said audio signal to said artificial speech signal" (col. 5, lines 20-44, the user can select between natural or technically generated signals to enable enjoyment [i.e., bypass processing], where when the ability to generate artificial speech is included, as taught by Boss, it would be obvious to include the selection process to bypass the synthesis operation , e.g., to enhance the quality of music heard).

Regarding **claim 122**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 121). In addition, Zoels teaches "wherein said signal processing unit is configured to automatically turn off said speech analysis and recognition module and said speech synthesis module to permit processing of said audio signal without converting said audio signal into said artificial speech signal" (see reasons for rejection of claim 121).

Regarding **claim 124**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 120). In addition, Zoels in view of Leonhard and Boss teaches " wherein said speech analysis and recognition module and said speech synthesis module are re-programmable" (Zoels teaches the use of replacement programs, col. 2, lines 30-35; and the software described by Leonhard and Boss is necessarily reprogrammable, see rejection of claim 120).

Regarding **claim 125**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 120). In addition, Leonhard teaches" wherein said speech analysis and recognition module is configured to assign said audio signal to phonetic or lexical categories, and wherein said speech synthesis module is configured to convert said audio signal assigned to phonetic or lexical categories to said artificial speech signal" (col. 11, lines 1-9, col. 13, lines 14-26, col. 15, lines 17-24, Figs. 8 and 19, items 23 [phoneme determination unit] and 24 [word determination unit], during analysis, recognition and synthesis, phonemes are used).

Regarding **claim 129**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 120). In addition, Zoels teaches "wherein said signal processing unit further comprises: modules configured to perform tinnitus masking" (col. 2, lines 36-45).

Regarding **claim 130**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 129). In addition, Zoels teaches "wherein said modules configured to perform tinnitus masking are configured to perform said tinnitus masking simultaneously with said conversion of said audio signal into said artificial speech signal" (col. 5, lines 25-35, various combinations including a combination of hearing aid with tinnitus therapy where Leonhard and Boss teach the use of artificial speech [see rejection of claim 96]).

Regarding **claim 131**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim 120). In addition, Leonhard teaches "wherein said speech analysis and recognition module is further configured to analyze said audio signal by performing speech segmentation or recognition" (Figs. 8, 19, abstract, col. 1, lines 5-20, col. 15, lines 49-54; the processor necessarily containing software modules).

Regarding **claim 134**, Zoels in view of Leonhard and Boss teaches everything claimed, as applied above (see claim120). In addition, Boss teaches "wherein said speech analysis and recognition module and said speech synthesis module comprise: dynamic modules configured to optimize speech analysis and recognition and speech synthesis" (abstract, Fig. 4, item 48; Fig. 5 item 98, col. 2, line 61 through col. 3, line 19; also adjustments [optimizations] are made, col. 8, lines 65-67; Zoels also teaches "adaptation to the hearing impairment" col. 2, lines 31-35).

6. Claims 126 and 128 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels in view of Leonhard, Boss, and further in view of Sonntag.

Regarding **claim 126**, this claim has limitations similar to claim 103 and is rejected for the same reasons.

Regarding **claim 128**, this claim has limitations similar to claim 105 and is rejected for the same reasons.

7. Claims 127 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels in view of Leonhard, Boss and further in view of Markowitz.

Regarding **claim 127**, this claim has limitations similar to claim 104 and is rejected for the same reasons.

8. Claims 136-138, 141, and 142 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels in view of Leonhard, Boss and further Kuzma.

Regarding **claim 136** this claim has limitations similar to claim 113 and is rejected for the same reasons.

Regarding **claim 137**, this claim has limitations similar to claim 114 and is rejected for the same reasons.

Regarding **claim 138**, this claim has limitations similar to claim 115 and is rejected for the same reasons.

Regarding **claim 141**, this claim has limitations similar to claim 118 and is rejected for the same reasons.

Regarding **claim 142**, this claim has limitations similar to claim 142 and is rejected for the same reasons.

9. Claims 143, 145-148 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels in view of Boss.

Regarding **claim 143**, Zoels discloses a programmable hearing aid, which includes the following features (see MPEP 2111.02 for effect of the preamble, "fully implantable" has no affect on the following steps, see rejection of claim 96 for "fully implantable"):

- converting a sensed acoustical signal into an electrical audio signal (Fig. 1 items 2 and 4, col. 2, lines 1-6);
- processing said audio signal (Fig. 1, items 6 and 7, col. 2, lines 1-6) comprising:

- stimulating one or more hearing structures of a recipient based on said artificial speech signal (col. 1, lines 9-11, an electroacoustical output transducer that will necessarily stimulate hearing structures); and

Furthermore, Zoels teaches the use of a programmable device [with necessary modules] where the modules can be replaced (consequence of being programmable) and adjusted (col. 5, lines 24-31), but Zoels does not specifically teach "detecting an extracting prosodic features from said audio signal with a first dynamic module; and converting said audio signal into an artificial speech signal based on said extracted prosodic features at a second dynamic module; allowing said first and second dynamic modules to optimize said processing." However, the examiner contends that this concept was well known in the art, as taught by Boss.

In the same field of endeavor, Boss discloses a system for retaining prosody during speech analysis for later playback. Boss's system includes a speech analyzer for detecting phonemes (abstract, Fig. 4, item 48, etc., first module) and a synthesizer for playback (Fig. 5 item 98, col. 2, line 61 through col. 3, line 19; also adjustments are made, col. 8, lines 65-67).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the features, as taught by Boss, since it is well known in the art for the purpose of improving the quality of the synthesized speech for hearing impaired individuals (Quagliaro, U.S. Patent 6,408,273, col. 3, lines 10-16).

Regarding **claim 145**, Zoels in view of Boss teaches everything claimed, as applied above (see claim 143). In addition, Zoels teaches "processing said audio signal without converting said audio signal into said artificial speech signal, and stimulating the one or more hearing structures of the recipient based on said non-converted audio signal" (col. 5, lines20-44, the user can select between natural or technically generated signals to enable enjoyment [i.e., bypass processing], where when the ability to generate artificial speech is included, as taught by Boss, it would be obvious to include the selection process to bypass the synthesis operation , e.g., to enhance the quality of music heard).

Regarding **claim 146**, Zoels in view of Boss teaches everything claimed, as applied above (see claim 145). In addition, Zoels teaches "turning off said first and second dynamic modules to enable processing of said audio signal without converting said audio signal to said artificial speech signal" (see rejection of claim 145).

Regarding **claim 147**, Zoels in view of Boss teaches everything claimed, as applied above (see claim 145). In addition, Zoels teaches "allowing said first and second dynamic modules to automatically turn off to permit processing of said audio signal without converting said audio signal into said artificial speech signal" (see rejection of claim 145).

Regarding **claim 148**, Zoels in view of Boss teaches everything claimed, as applied above (see claim 143). In addition, Zoels (and Boss) teaches "performing additional processing of said audio signal with adaptive signal processing algorithms" (Zoels, col. 2, lines 20-25, replacement program; Boss, col. 8, lines 64-67).

10. Claim 144 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zoels in view of Boss and further in view of Zenner.

Regarding **claim 144**, Zoels in view of Boss teaches everything claimed, as applied above (see claim 43). But Zoels does not specifically teach "reprogramming said first and second modules via wireless telemetry means." However, the examiner contends that this concept was well known in the art, as taught by Zenner.

In the same field of endeavor, Zenner teaches the use of a totally implantable hearing device for senorineural hearing loss where the device can be programmed by induction (p.1, ¶2, i.e., controlled from outside the body).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Zoels by specifically providing the features, as taught by Zenner, because of the improved performance that can be realized by using such a structure (Zenner, p. 1, ¶1).

Response to Arguments

11. Applicant's arguments with respect to claim 96-148 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

12. Claims 116, 117, 139 and 140 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 116 and 139, It is noted that the closest prior art of record, Zoels et al. (US Patent 6,047,074), teach the use of a processor based hearing aid with an actuator, but Zoels et al. do not teach that said array of actuators comprises an array of electromechanical converters embedded in said carrier member.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to V. Paul Harper whose telephone number is (571) 272-7605. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

4/09/2007

VPH

V. PAUL HARPER
PRIMARY PATENT EXAMINER